exposing said barrier conductor layer to a first gas atmosphere at an elevated substrate temperature;

B1 cont'd

forming, after said step of exposing said barrier conductor layer to said first gas atmosphere, a metal film on said barrier conductor layer by a CVD process; and

exposing said metal film to a second gas atmosphere at an elevated substrate temperature.

Page 5, second full paragraph:

According to the inventions, adhesion between the barrier conductor layer and the metal film formed by the CVD process is improved substantially. The first gas may be any or more of a reducing gas such as silane, ammonia or hydrogen, while the second gas may be any or more of hydrogen and nitrogen. The first and second exposing steps my be conducted at a substrate temperature of 250-500°C. It is preferable to use a monosilane SiH_4 for the silane source compound, which is generally represented as $Si_nH_2n_{+2}$. Further, it is preferable to conduct the first exposing process at the temperature of 300-450°C and the second exposing process at the temperature of 300-400°C. Further, it is preferable to form the metal film by Cu and the barrier layer by Ta or TaN.

B2

Page 5, third full paragraph:

Another object of the inventions is to provide a method of fabricating a semiconductor device, comprising the steps of:

forming a barrier conductor layer of any of tungsten nitride or tantalum nitride on a substrate;

B3

B^3 cont'd

exposing said barrier conductor layer to a plasma of a reducing gas at an elevated temperature; and

forming, after said step of exposing said barrier conductor layer to said plasma, a metal conductor layer on said barrier conductor layer by a CVD process.

Page 6, first full paragraph:

B4

According to the inventions, excellent blocking of element diffusion is achieved by using tungsten nitride or tantalum nitride for the barrier conductor layer. Further, adhesion between the barrier conductor layer and the metal film is improved. In the claimed inventions, the barrier conductor layer may be provided directly on the substrate or on an insulating film covering the surface of the substrate. Preferably, H_2 is used for the reducing gas. Further, it is preferable to conduct the plasma process at a temperature of 50-400°C, more preferably at a temperature of 100-250°C. In the present invention, it is further preferable to conduct an exposing step exposing the metal film to a gas after the step of forming the metal film at an elevated temperature of 250-500°C, more preferably at a temperature of 300-400°C. The metal film may be formed of a Cu film.

Page 6, second full paragraph:

B5

Another object of the inventions is to provide a method of fabricating a semiconductor device, comprising the steps of:

alternately and repeatedly forming,, on a substrate, and insulating film, a barrier conductor layer of any of tungsten nitride and tantalum nitride, and a metal film, said metal film being formed by a CVD process,

B5 cont'd

wherein a step of exposing said barrier conductor film to a plasma of a reducing gas at an elevated temperature is interposed between said step of forming said barrier conductor layer and said step of forming said metal film.

Page 9, third full paragraph:

B6

Next, in the step of FIG.5 corresponding to the step S4 of FIG.1, the structure of FIG.4 is subjected to an annealing process conducted in a reducing gas atmosphere. Preferably, a silane (Si_nH2_{n+2}) gas, particularly a monosilane (SiH_4) gas, or an ammonia (NH_3) gas or a hydrogen gas (H_2) is used for the reducing gas, and the annealing process is conducted under a reduced pressure environment of about 40Pa at the temperature of 250-500°C, preferably 450°C, for a duration of about 3 minutes. During the annealing process, one or more of the foregoing reducing gases are supplied. In the case of using NH_3, the NH_3 gas is supplied with a flow-rate of 200 SCCM in the maximum, while in the case of using SiH_4, the SiH_4 gas is supplied with a flow-rate of 5SCCM in the maximum. In the case of using H_2, the H_2 gas is supplied with a flow-rate of 500 SCCM in the maximum. Thereby, two or more gases may be mixed in the annealing process.

Page 11, second full paragraph:

B7

Next, in the step of FIG.8 corresponding to the step S7 of FIG.1, the Cu layer 26 thus formed is then subjected to an annealing process conducted in a atmosphere. More specifically, an atmosphere of any of NH_3, He, H_2, N_2 and Ar is used, and the annealing process is conducted under a pressure of at least 10 Pa at a temperature of 250-500°C for a duration of about 0.5 minutes more. For example, the annealing process may be conducted at 350°C over a duration of 5 minutes. The duration of the annealing process depends on the